In The Claims

1. (Currently amended) A crystal growth method for the group-III nitride compound semiconductors, comprising:

forming a MOCVD-grown periodic or non-periodic amorphous or polycrystalline intermediate, non-light-emitting multi-layered buffer having at least three layers with each layer having a thickness in the range from 2 nm to 6 nm on a substrate at a first temperature in the range of 500°C to 550°C, in which the layers alternate between at least two types of compound semiconductors A and B different from each other in lattice constant, energy band gap, layer thickness, and composition; and

forming a MOCVD-grown layer of a group-III nitride compound semiconductor on the formed intermediate multi-layered buffer, wherein said layer of a group-III nitride is formed at a second temperature in the range of 1000°C to 1100°C ~~higher than said first temperature~~ and said intermediate multi-layered buffer adjoins both said layer of group-III nitride compound and said substrate, whereby said intermediate multi-layered buffer partially recrystalizes at said ~~higher~~ second temperature, thereby relieving lattice strain between said layer of group-III nitride compound and said substrate, and facilitating improved crystalline quality of said group-III nitride compound.

2. (Previously presented) A crystal growth method according to claim 1, further comprising doping a n- or p-type in said group-III nitride compound semiconductor.

3. (Previously presented) A crystal growth method according to claim 1, wherein the compound semiconductors A and B are alternatively and periodically grown by MOCVD on said substrate to form said multi-layered buffer.

4. (Previously presented) A crystal growth method according to claim 1, wherein the compound semiconductors A and B are alternatively grown by MOCVD on a substrate with the thickness of the layers varying from one to another to form said multi-layered buffer.

5. (Original) A crystal growth method according to claim 1, wherein a number of compound semiconductors A, B, C . . . . . form a sequence of ABC. . . . . wherein said sequence is alternately grown on said substrate at said first temperature to form said multi-layered buffer, and wherein said compound semiconductors are different from each other in lattice constant, energy band gap, layer thickness, and composition.

6. (Original) A crystal growth method according to claim 1, wherein said substrate is made of sapphire wafer with any possible orientation.

7. (Original) A crystal growth method according to claim 1, wherein said first temperature is around 525 °C and said second temperature is around 1,050°C.

8. (Original) A crystal growth method according to claim 3, wherein said multi-layered buffer consists of three periods of repeated AB units and the total layer thickness of said multi-layered buffer is approximately 24 nm.

9. (Original) A crystal growth method according to claim 3, wherein said compound semiconductors A and B are made of GaN and $Ga_xAl_{1-x}N$ ($0 \leq x \leq 1$), respectively.

10. (Original) A crystal growth method according to claim 3, wherein said compound semiconductors A and B are made of GaN and $Ga_yIn_{1-y}N$ ($0 \leq y \leq 1$), respectively.

11. (Original) A crystal growth method according to claim 5, wherein said compound semiconductors A, B, C, ... are made of GaN, $Ga_xAl_{1-x}N$ ($0 \leq x \leq 1$), $Ga_yIn_{1-y}N$ ($0 \leq y \leq 1$) . . . . . ., respectively.

12. (Currently Amended) A group-III nitride compound semiconductor, comprising:

a MOCVD-grown periodic or non-periodic intermediate, non-light-emitting multi-layered buffer having at least three layers with each layer having a thickness in the range from 2 nm to 6 nm on a substrate grown at a first temperature in the range of 500°C to 550°C, in which the layers alternate between at least two types of compound semiconductors A and B different from each other in lattice constant, energy band gap, layer thickness, and composition, said intermediate multi-layered buffer being amorphous or polycrystalline when formed at said first temperature; and

a MOCVD-grown layer of a group-III nitride compound semiconductor on the formed intermediate multi-layered buffer wherein said layer of group-III is formed at a second temperature in the range of 1000°C to 1100°C ~~that is higher than said first temperature~~ and said intermediate multi-layered buffer adjoins said layer of group-III nitride compound and said substrate, said intermediate multi-layered buffer being partially recrystallized at the ~~higher~~

second temperature, thereby relieving strain between said layer of group III nitride compound and said substrate, and facilitating improved crystalline quality of said group-III nitride compound.

13. (Previously presented) A method as recited in claim 1 wherein the multi-layered buffer thickness is less than 96 nm.

14. (Previously presented) A method as recited in claim 1 wherein the multi-layered buffer thickness is less than 48 nm.